FURTHER RESULTS IN THE DEVELOPMENT
OF A TEST OF ROUGHNESS DISCRIMINATION

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ROUGHNESS DISCRIMINATION

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Introduction

In a previous report (1), the author described results and relationships obtained using an experimental test of roughness discrimination. These were, briefly, that this ability did not appear related to chronological age, mean scores increased with grade level for grades Kindergarten through four, and mean scores for this ability increased upon retest after a period of one year. The reliability of the experimental test was quite low $(r = .48)$.

Because of the possibility that a test of this ability might prove useful in predicting Braille reading readiness it was deemed necessary to build a more reliable test and replicate the study. This has been done during the past year and results of this effort are reported here.

Procedure

In order to achieve greater test reliability the number of items was increased to 75. Test items consisted of pieces of sandpaper mounted in pairs of different grit size on 5" x 8" cards. The 18 grit sizes used ranged from 24 - 600. In no pair were grit sizes matched which were more than 5 grades apart. Serial order and left-right position for the items were randomized. As previously described the task for the subject was to identify tactually the rougher of the two squares of sandpaper. All children were tested individually.

Subjects

The subjects were 98 children who were enrolled in the Ohio State School
for the Blind in December 1959. The children were all Braille readers or poten-
tially so from the following grades:

1. Kindergarten - 11 girls and 9 boys, ages 60-107 months
2. First - 11 girls and 13 boys, ages 72-105 months
3. Second - 13 girls and 10 boys, ages 84-124 months
4. Third - 11 girls and 7 boys, ages 93-149 months
5. Fourth - 8 girls and 5 boys, ages 112-168 months

Results

Analysis of the individual test items revealed that 11 of these failed to
discriminate among the subjects. These items were omitted when the tests were
scored for data analysis. A corrected split-half reliability of .91 indicated
that the goal of building a more reliable test had been met. Other correlations
computed were IQ - total test score (.42) and *IQ* - chronological age (.44). All
these coefficients are significantly different from zero beyond the .01 level of
confidence. The standard error of measurement for the revised test was 1.67.

TABLE I

GRADE MEANS, STANDARD DEVIATIONS, AND SIGNIFICANCE

OF DIFFERENCES AMONG MEANS

Higher Grade Mean Minus Lower Grade Mean				Mean	S. D.	N
Grades 1	2	3	4			
K 11.8**	17.0**	19.0**	16.9**	39.6	7.9	20
1	5.2*	7.2**	5.1*	51.4	7.3	24
2		2.0	-0.1	56.6	5.5	23
3			-2.1	58.6	3.5	18
4				56.5	4.3	13

** Significant at the .01 level of confidence
* Significant at the .05 level of confidence

Results for use of the revised tests roughly paralleled those previously de-
scribed. Grade means, standard deviations, and differences among grade means are

presented in Table I. Mean scores for grades increased with grade level. Analysis of variance among groups revealed that mean grade scores for Kindergarten and first grade were significantly different (.05 level of confidence) from one another and from all other grades. Increase in mean score appeared to cease at the second or third grade level. At the same time group variability decreased and appeared to become stablized. This is clearly illustrated by the score frequency distribution given in Table 2.

TABLE 2

FREQUENCY DISTRIBUTIONS FOR SCORES OBTAINED IN EACH GRADE

Score Category	K	1	2	3	4
27 - 29	2				
30 - 32	3	1			
33 - 35	2				
36 - 38	3		1		
39 - 41	3	1			
42 - 44	1	2			
45 - 47		3			1
48 - 50	4	3	1		
51 - 53	2	4	1	3	1
54 - 56		3	6	1	4
57 - 59		4	7	5	4
60 - 62		3	7	6	2
63 - 65				3	1

Discussion

The present study has demonstrated the possibility of constructing a highly reliable test of this type. The ability the test measures appears to develop quite early in blind children and become stabilized by the time they reach the third grade. There is a definite but small relationship between this ability and both IQ and chronological age.

It is still not clear exactly what quality or factor the test measures. However, face validity would indicate that this is tactile discrimination of roughness. Although a low correlation with IQ was found, no information is available on relationship between test score and mental age. If the latter relationship was found

to be slight, this would increase the possibility that the test measures a tactile factor that could be involved in readiness for Braille reading.

The test still fails to provide for a range of variability in test scores great enough to discriminate adequately between individuals and groups. Due to the use of two-choice items, maximum variability theoretically possible is only 32 score points. Another problem encountered is that the concepts "rough or rougher" used in the instruction are not understood by some very young children. This factor reduces the usefulness of the test.

Plans have been made to undertake further research to establish the relation between test score and mental age, to increase the range of variability for test scores, and to simplify the task for the very young. If these problems are satisfactorily resolved, the test will be validated to establish its usefulness in predicting reading readiness.

Summary

98 children in grades Kindergarten through four were administered a test of roughness discrimination. Grade means increased significantly up through grade three where group performance leveled off and became less variable. Low relationships were found between test score and both IQ and chronological age.

References

1. Nolan, C. Y. Roughness discrimination among blind children in the primary grades. Intern. J. educ. Blind, 1960, 9, 97-100.